Utilizing GIS in Public Health Emergencies

During an emergency, information about the location of events and resources is often missing. GIS (Geographic Information System) is a technology that brings this information together by physical location. GIS can be an integral part of the emergency response process, including planning, mitigation, response, and recovery.

The Missouri Department of Health and Senior Services has incorporated GIS into their emergency planning. The Missouri Emergency Response Geographic Information System (MERGIS) was developed to aid and enhance health emergency response through the use of GIS. This program began by providing GIS support during an emergency, but has now expanded to include GIS support in emergency planning and health surveillance as well.

By utilizing GIS in an Command Center, answers can be quickly found to questions such as "Which hospital can we reroute our injured to?" or "What roads need to be evacuated?" DHSS has brought together a team of GIS professionals to provide GIS support in an Emergency Operations Center, the Department's Decision Support Room (DSR), or their Mobile Command Center during an emergency event. The team's primary function is to input incoming information and quickly transform it into an easily visualized format. Information is added to the system as the situation changes and customized maps can be created. Team members can also take collected data from the event and upload it to MERGISweb, an Internet mapping website, where it is available to emergency managers statewide.

This GIS team was able to test their skills in a recent Department DSR emergency response exercise. This three-day exercise contained a variety of simulated catastrophes across the state. With the help of GIS, exercise participants were able to visualize events and resources, and quickly make decisions with this information. A large digital screen in the DSR dedicated to mapping was continuously updated with current events throughout the exercise (Figure 1).

The exercise began with major flooding of the Missouri and Mississippi Rivers. The GIS team was able to use flood data and census information to estimate the number of people that were in the disaster areas. When the simulation added an earthquake in the Southeast portion of the state, the decision was made to dispatch the Mobile Command Center (MCC) to provide backup support for the DSR. The GIS team was able to use flood, earthquake, and road data to determine which areas in the state would be desirable for a command center, and if these locations would be reachable by the MCC.

GIS was used once again when the simulation portrayed a train carrying chlorine that derailed and began to leak. By combining a chlorine plume model with current weather conditions, the GIS team was able to provide participants with an idea of the affected area, as well as a list of nearby schools, nursing homes, and daycares that may have needed special attention.

This DSR exercise illustrated just some of the ways that DHSS is using GIS in Public Health Emergencies. GIS can also be used to assist with operations such as locating outbreaks, tracking contagions and determining at-risk populations. No matter what the emergency, GIS will continue to be a valuable tool when decisions must be made quickly and lives are threatened.

Figure 1 - Update maps were created in order to give managers a picture of events that were happening around the state.